WATER T&D Construction Standard

JOINT RESTRAINT CHART

APPLICATION: New ductile iron water mains & water services.

Minimum Length (in feet) of restrained joint piping required on each side of fitting							
Joint Description	Joint Orientation	Minimum length of feet of pipe to be restrained per pipe diameter					
		4" Dia.	6" Dia.	8" Dia.	10" Dia.	12" Dia.	16" Dia.
22-1/2° Bend	Horizontal	3 ft	4 ft	5 ft	6 ft	7 ft	30 ft
45° Bend	Horizontal	6 ft	8 ft	11 ft	13 ft	15 ft	19 ft
45° Offset	Horizontal	6 ft	6 ft	12 ft	13 ft	19 ft	27 ft
45° Offset	Vertical	22 ft	30 ft	43 ft	51 ft	64 ft	85 ft
90° Bend	Horizontal	14 ft	20 ft	25 ft	31 ft	36 ft	46 ft
Reducer		-	6"x4" 25 ft	8"x6" 27 ft	10"x8" 27 ft	12"x10" 27 ft	16"x12" 50 ft
Tee Run		18 ft	18 ft	18 ft	18 ft	18 ft	18 ft
Tee Branch		33 ft	47 ft	63 ft	75 ft	89 ft	115 ft
Dead-End	Horizontal	34 ft	49 ft	63 ft	76 ft	90 ft	116 ft

Restrained chart W-02-0100 is based on the DIPRA Thrust Restraint Program. BWL restraint requirements specified in this standard are designed to be used on new construction assuming a type 3 laying condition, good sand & gravel backfill, 5 ft depth of cover, design pressure of 150 psi, polyethylene encasement and a safety factor of 2. If laying conditions vary in any way from these assumptions, contact BWL Engineer to determine restraint requirements.

Restraint requirements specified in this table shall begin at the joint of the fitting (which is always restrained).

For tee runs which are capped or plugged, the restraint through the run shall be equivalent to the length required for a dead-end.

Only BWL approved restrained joint gaskets and mechanical joint restraints shall be used for pipe restraint. Restraints must be verified. If restraints cannot be verified, refer to BWL Engineer for alternate restraint methods.

Alternate methods of restraint, such as thrust blocks and rodding, shall not be used unless approved by the BWL Engineer - **without exception.**

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